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APPLICATION NO.	FILING DATE	FIRST NAMED INVENTOR	ATTORNEY DOCKET NO.	CONFIRMATION NO.
10/017,487	12/11/2001	Tong Sun	KCC-16,156	5645

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EXAMINER
KUMAR, PREETI

ART UNIT	PAPER NUMBER
1751	5

DATE MAILED: 01/03/2003

Please find below and/or attached an Office communication concerning this application or proceeding.

PL 5

Office Action Summary	Applicati n No.	Applicant(s)	
	10/017,487	SUN ET AL.	
	Examiner	Art Unit	
	Preeti Kumar	1751	

-- Th MAILING DATE of this communication app ars on th cover sh t with the correspondence address --

Period for Reply

A SHORTENED STATUTORY PERIOD FOR REPLY IS SET TO EXPIRE 3 MONTH(S) FROM THE MAILING DATE OF THIS COMMUNICATION.

- Extensions of time may be available under the provisions of 37 CFR 1.136(a). In no event, however, may a reply be timely filed after SIX (6) MONTHS from the mailing date of this communication.
- If the period for reply specified above is less than thirty (30) days, a reply within the statutory minimum of thirty (30) days will be considered timely.
- If NO period for reply is specified above, the maximum statutory period will apply and will expire SIX (6) MONTHS from the mailing date of this communication.
- Failure to reply within the set or extended period for reply will, by statute, cause the application to become ABANDONED (35 U.S.C. § 133).
- Any reply received by the Office later than three months after the mailing date of this communication, even if timely filed, may reduce any earned patent term adjustment. See 37 CFR 1.704(b).

Status

1)☒ Responsive to communication(s) filed on *March 21, 2002* .

2a)☐ This action is **FINAL**. 2b)☒ This action is non-final.

3)☐ Since this application is in condition for allowance except for formal matters, prosecution as to the merits is closed in accordance with the practice under *Ex parte Quayle*, 1935 C.D. 11, 453 O.G. 213.

Disposition of Claims

4)☒ Claim(s) *1-75* is/are pending in the application.

4a) Of the above claim(s) _____ is/are withdrawn from consideration.

5)☐ Claim(s) _____ is/are allowed.

6)☒ Claim(s) *1-75* is/are rejected.

7)☐ Claim(s) _____ is/are objected to.

8)☐ Claim(s) _____ are subject to restriction and/or election requirement.

Application Papers

9)☐ The specification is objected to by the Examiner.

10)☐ The drawing(s) filed on _____ is/are: a)☐ accepted or b)☐ objected to by the Examiner.

Applicant may not request that any objection to the drawing(s) be held in abeyance. See 37 CFR 1.85(a).

11)☐ The proposed drawing correction filed on _____ is: a)☐ approved b)☐ disapproved by the Examiner.

If approved, corrected drawings are required in reply to this Office action.

12)☐ The oath or declaration is objected to by the Examiner.

Priority under 35 U.S.C. §§ 119 and 120

13)☐ Acknowledgment is made of a claim for foreign priority under 35 U.S.C. § 119(a)-(d) or (f).

a)☐ All b)☐ Some * c)☐ None of:

1.☐ Certified copies of the priority documents have been received.

2.☐ Certified copies of the priority documents have been received in Application No. _____ .

3.☐ Copies of the certified copies of the priority documents have been received in this National Stage application from the International Bureau (PCT Rule 17.2(a)).

* See the attached detailed Office action for a list of the certified copies not received.

14)☐ Acknowledgment is made of a claim for domestic priority under 35 U.S.C. § 119(e) (to a provisional application).

a) ☐ The translation of the foreign language provisional application has been received.

15)☐ Acknowledgment is made of a claim for domestic priority under 35 U.S.C. §§ 120 and/or 121.

Attachment(s)

1) ☒ Notice of References Cited (PTO-892)
2) ☐ Notice of Draftsperson's Patent Drawing Review (PTO-948)
3) ☒ Information Disclosure Statement(s) (PTO-1449) Paper No(s) *4* .
4) ☐ Interview Summary (PTO-413) Paper No(s). _____ .
5) ☐ Notice of Informal Patent Application (PTO-152)
6) ☐ Other: .

DETAILED ACTION

1. Claims 1-75 are pending.

Claim Rejections - 35 USC § 112

2. The following is a quotation of the second paragraph of 35 U.S.C. 112:

> The specification shall conclude with one or more claims particularly pointing out and distinctly claiming the subject matter which the applicant regards as his invention.

3. Claims 20-23 are rejected under 35 U.S.C. 112, second paragraph, as being indefinite for failing to particularly point out and distinctly claim the subject matter which applicant regards as the invention. Claims 20-23 recite the limitation "water retention value" in claim 1. There is insufficient antecedent basis for this limitation in the claim.

Claim Rejections - 35 USC § 102

4. The following is a quotation of the appropriate paragraphs of 35 U.S.C. 102 that form the basis for the rejections under this section made in this Office action:

> A person shall be entitled to a patent unless –
>
> (b) the invention was patented or described in a printed publication in this or a foreign country or in public use or on sale in this country, more than one year prior to the date of application for patent in the United States.

Claim Rejections - 35 USC § 103

5. The following is a quotation of 35 U.S.C. 103(a) which forms the basis for all obviousness rejections set forth in this Office action:

> (a) A patent may not be obtained though the invention is not identically disclosed or described as set forth in section 102 of this title, if the differences between the subject matter sought to be patented and the prior art are such that the subject matter as a whole would have been obvious at the time the invention was made to a person having ordinary skill in the art to which said subject matter pertains. Patentability shall not be negatived by the manner in which the invention was made.

6. The factual inquiries set forth in *Graham* **v.** *John Deere Co.*, 383 U.S. 1, 148 USPQ 459 (1966), that are applied for establishing a background for determining obviousness under 35 U.S.C. 103(a) are summarized as follows:

1. Determining the scope and contents of the prior art.
2. Ascertaining the differences between the prior art and the claims at issue.
3. Resolving the level of ordinary skill in the pertinent art.
4. Considering objective evidence present in the application indicating obviousness or nonobviousness.

7. Claims 1-4, 7-27, 30-52, 54-75 are rejected under 35 U.S.C. 102(b) as anticipated by or, in the alternative, under 35 U.S.C. 103(a) as obvious over Dutkiewicz et al. (US 5,858,021).

Dutkiewicz et al. teach a process for treating cellulosic fibers using high temperatures that is effective to result in modified cellulosic fibers that exhibit desired properties such as water retention values and wet curl values. See abstract.

Specifically regarding claims 3-4, 26-27 and 51-52, Dutkiewicz et al. teach that the heat treating process generally causes the cellulosic fibers to become modified. It is believed that the heat treating process causes the cellulosic fibers to undergo a degree of self-crosslinking through the formation of ester and/or ether linkages. Esterification is believed to occur between carboxyl groups and hydroxyl groups on the original cellulosic polymer or those resulting from oxidation of the cellulosic fibers due to the heat treating. Etherification is believed to possibly occur by reaction between the hydroxyl groups themselves or between hydroxyl groups and aldehyde groups. Aldehyde groups are typically more abundant in partly oxidized cellulose. Those skilled in the art will recognize that the presence of crosslinks formed by esterification or

etherification can generally be detected through various analytical techniques. For example, infrared transmission spectroscopy can be used to study and verify the presence of ester and ether crosslinks in cellulosic fibers. See col.5, ln.65-col.6, ln.6.

Specifically regarding claims 10, 33, 47-49 and 63, Dutkiewicz et al. teach a process for treating cellulosic fibers comprises treating dry cellulosic fibers at a temperature above about 150° C. for an amount of time that is effective to result in modified cellulosic fibers that exhibit a Water Retention value that is less than about 1.0. Generally, if the temperature used is too low, there will not be a substantial and/or effective amount of modification of the cellulosic fibers that occurs. Also, generally, if the temperature used is too high, a substantial degradation of the cellulosic fibers may occur which will negatively affect the properties exhibited by the crosslinked cellulosic fibers. As such, as a general rule, the cellulosic fibers will be heat treated at a temperature within the range beneficially from about 150° C. to about 200° C., suitably from about 150° C. to about 250° C., more suitably from about 170° C. to about 250° C., and most suitably from about 190° C. to about 220° C. See col.2, ln.50-60.

Specifically regarding claims 34-36 and 54-57, Dutkiewicz et al. teach catalysts useful in the high temperature treatment process of the present invention include, but are not limited to, phosphoric acid, cupric acetate, ferric chloride, aluminum sulfate, sodium bisulfite, boric acid, zirconium containing compounds, and mixtures thereof. The catalyst is generally used in an amount beneficially between about 0.001 weight percent to about 1 weight percent, suitably between about 0.002 weight percent to about 0.5 weight percent, and more suitably between about 0.003 weight percent to about 0.3

weight percent, wherein the weight percent of the catalyst is based on the total weight of cellulosic fibers. See col.4, ln.10-30.

Specifically regarding claims 58-60, the examiner notes that Dutkiewicz et al. do not teach the utility of swelling agents however do teach the addition of sodium hydroxide to the crosslinking solution to adjust the cellulosic fiber slurry to a target pH of between about pH 6 or 7. See col.7, ln.55-65.

Specifically regarding the wet curl value, Dutkiewicz et al. teach that the cellulosic fibers will be considered to be effectively treated by the heat treatment when the cellulosic fibers exhibit a Wet Curl value that is greater than about 0.10, beneficially between about 0.11 to about 0.3, more suitably between about 0.15 to about 0.20. In contrast, cellulosic fibers that have not been treated generally exhibit a Wet Curl value that is about 0.1 or less. See col.7, ln.45-55.

Specifically regarding the water retention values, Dutkiewicz et al. teach that the cellulosic fibers will be considered to be effectively treated by heat treatment when the cellulosic fibers exhibit a Water Retention value that is less than about 1.0 gram of water per gram of cellulosic fiber (gram per gram), beneficially less than about 0.9 gram per gram and more suitably less than about 0.6 gram per gram. In contrast, cellulosic fibers that have not been heat treated or that have been treated at too low of a temperature generally exhibit a Water Retention value that is greater than 1.0 gram per gram and generally greater than about 1.2 gram per gram. See col.6, ln.29-40.

Specifically regarding the method recited in claims 47-75, Dutkiewicz et al. teach individualized, crosslinked fibers used in the absorbent structures made by a dry

crosslinking process utilizing phosphoric acid as the crosslinking agent. Please see example 1 in its entirety, where Dutkiewicz et al. teach mixing, drying, separating, and heating the curly cellulose fibers to produce fibers having water retention values and wet curl values encompassed within the broad range as recited by the instant claims. See example 1, col.11.

Accordingly, the broad teachings of Dutkiewicz et al. appear to anticipate the material limitations of the instant claims. Alternatively, even if the broad teachings of Dutkiewicz et al. are not sufficient to anticipate the material limitations of the instant claims, it would have been nonetheless obvious to one of ordinary skill in the art, to use a polymeric reactive compound to create a high wet resiliency curly cellulose fiber because Dutkiewicz et al. teach a high wet resiliency curly cellulose fiber having water retention values, curl values and wet curl values encompassed within the broad range as recited by the instant claims.

8. Claims 1-75 are rejected under 35 U.S.C. 103(a) as obvious over Herron et al. (US 5,137,537).

Herron et al. teach individualized, crosslinked fibers preferably have a C2-C9 polycarboxylic acid crosslinking agent reacted with the fibers in the form of intrafiber crosslink bonds. Preferably, the crosslinking agent is citric acid, and between about 0.5 mole % and about 10.0 mole % crosslinking agent react to form the intrafiber crosslink bonds. See abstract.

Specifically regarding claims 3-4, 26-27, and 51-52 Herron et al. teach that the C2-C9 polycarboxylic acids suitable for use as cellulose crosslinking agents in the present invention include aliphatic and alicyclic acids either olefinically saturated or unsaturated with at least three and preferably more carboxyl groups per molecule or with two carboxyl groups per molecule if a carbon-carbon double bond is present alpha, beta to one or both carboxyl groups Herron et al. teach that for a carboxyl group to be reactive, it must be able to form a cyclic 5- or 6-membered anhydride ring with a neighboring carboxyl group in the polycarboxylic acid molecule. See col.5, ln.30-50.

Specifically regarding claims 5-6, 28-29, 53 Herron et al. teach examples of specific polycarboxylic acids which fall within the scope of this invention include the following: maleic acid, citraconic acid also known as methylmaleic acid, citric acid, itaconic acid also known as methylenesuccinic acid, tricarballylic acid also known as 1,2,3 propane tricarboxylic acid, transaconitic acid also known as trans-1-propene-1,2,3-tricarboxylic acid, 1,2,3,4-butanetetracarboxylic acid, all-cis-1,2,3,4-cyclopentanetetracarboxylic acid, mellitic acid also known as benzenehexacarboxylic acid, and oxydisuccinic acid also known as 2,2'-oxybis(butanedioic acid). See col.6, ln.1-15.

Specifically regarding claims 10, 33, 47-49 and 63 Herron et al. teach that the defibrated fibers are dried to between 60% and 100% consistency by a method known in the art as flash drying. Flash drying to higher consistency provides a greater level of fiber twist and curl than does flash drying to a consistency in the lower part of the 60%-100% range. See col.12, ln.25-35. The flash dried fibers are then heated to a suitable

temperature for an effective period of time to cause the crosslinking agent to cure, i.e., to react with the cellulosic fibers. Drying temperatures from about 145° C. to about 165° C. for periods of between about 30 minutes and 60 minutes, under static, atmospheric conditions will generally provide acceptable curing efficiencies for fibers having moisture contents less than about 10%. Those skilled in the art will also appreciate that higher temperatures and forced air convection decrease the time required for curing. Thus, drying temperatures from about 70° C. to about 190° C. for periods of between about 2 minutes and 20 minutes, in an air-through oven will also generally provide acceptable curing efficiencies for fibers having moisture contents less than about 10%. Curing temperatures should be maintained at less than about 225° C., since exposure of the fibers to such high temperatures may lead to darkening or other damaging of the fibers. See col.12, ln.44-70.

Specifically regarding claims 34-36 and 54-57, Herron et al. teach that the fibers can also be contacted with an appropriate catalyst prior to crosslinking. Applicable catalysts include alkali metal hypophosphites, alkali metal phosphites, alkali metal polyphosphates, alkali metal phosphates, and alkali metal sulfates. Especially preferred catalysts are the alkali metal hypophosphites, alkali metal phosphates, and alkali metal sulfates. The mechanism of the catalysis is unknown, although applicants believe that the catalysts may simply be functioning as buffering agents, keeping the pH levels within the desired ranges. See col.11, ln.32-47.

Specifically regarding claims 58-60, the examiner notes that Herron et al. do not teach the utility of swelling agents however do teach the addition of sodium hydroxide to

the crosslinking solution to adjust the cellulosic fiber slurry to a taget pH of between about pH 1.5 and about pH 5. See col.11, ln.20-32 and example 1.

Specifically regarding the method recited in claims 47-75, Herron et al. teach individualized, crosslinked fibers used in the absorbent structures made by a dry crosslinking process utilizing citric acid as the crosslinking agent. Please see example 1 in its entirety, where Herron et al. teach mixing, drying, separating, and heating the curly cellulose fibers to produce fibers having water retention values encompassed within the broad range as recited by the instant claims.

Herron et al. teach do not specifically teach a high wet resiliency curly cellulose fiber wherein the cellulose fiber is modified using a high-energy dispenser and comprises a steam explosion fiber and has the curl values and wet curl values as recited by the instant claims.

However, it would have been obvious, to one of ordinary skill in the art, at the time the invention was made, to formulate a high wet resiliency curly cellulose fiber wherein the cellulose fiber is modified using a high-energy dispenser and comprises a steam explosion fiber and has the curl values and wet curl values as recited by the instant claims with a reasonable expectation of success, because the teachings of Herron et al. suggest a high wet resiliency curly cellulose fiber wherein the cellulose fiber is modified using a flash drying method to produce fibers having water retention values encompassed within the broad range as recited by the instant claims.

Conclusion

Any inquiry concerning this communication or earlier communications from the examiner should be directed to Preeti Kumar whose telephone number is 703-305-0178. The examiner can normally be reached on M-F 9:00am - 5:30pm.

If attempts to reach the examiner by telephone are unsuccessful, the examiner's supervisor, Yogendra N. Gupta can be reached on 703-308-4708. The fax phone numbers for the organization where this application or proceeding is assigned are 703-872-9310 for regular communications and 703-872-9311 for After Final communications.

Any inquiry of a general nature or relating to the status of this application or proceeding should be directed to the receptionist whose telephone number is 703-872-9309.

Preeti Kumar
Examiner
Art Unit 1751

PK
December 26, 2002

YOGENDRA N. GUPTA
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